REMARKS

In response to an Office Action mailed on May 1, 2007, Applicant respectfully requests that the Application be reconsidered in light of the following remarks. Twenty-seven claims are presented for examination. Of these, claims 1, 7 and 13 are independent, and the remaining claims are dependent.

The Office Action rejected claims 1-27 under 35 U.S.C. 103(a) as being obvious over U.S. Pat. No. 6,709,111 to Hirao, *et al.* ("Hirao") in view of U.S. Pat. No. 6,388,392 to Flory IV ("Flory") and further in view of US Pat. No. 4,618,803 to Hardy ("Hardy"). The Applicant respectfully traverses these rejections. Contrary to the assertion in the Office Action, Flory can not be read to provide a motivation to arrange circuits in either series or parallel. Rearranging Florey's circuit, as suggested in the Office Action, would yield an inoperative circuit. Furthermore, no combination of the cited references yields all the claim limitations. These issues are discussed in detail below.

The present Application discloses a backup power supply for supplying electric power to fan rotor circuitry when an input voltage becomes insufficient to power the fan rotor circuitry. The fan rotor circuitry controls rotation of a fan rotor. In one application, such a backup power supply operates a fan to cool a bulb in a projector, even if the projector is turned off or power to the projector fails.

The backup power supply includes a "charge-current limited energy storage circuit." This energy storage circuit includes capacitive storage, such as a capacitor. For simplicity, the term "capacitor" is used herein to represent capacitive storage, although other forms of capacitive storage may be used.

When a discharged capacitor, particularly a high-value capacitor, is initially connected to an input voltage, the capacitor provides a low resistance path, and a large current flows through the path. This high current may cause a voltage drop in a supply voltage connected to the capacitor. If another circuit, such as a fan rotor circuit or a lamp, is connected to the same supply voltage, the drop in the supply voltage may be large enough to prevent the other circuit from operating.

Over time, as the capacitor charges, the current into the capacitor exponentially decreases, and the voltage drop becomes progressively smaller. Eventually, when the capacitor is fully charged, the current and the voltage drop both become essentially zero.

Flory discloses an energy storage bank (ESB) 48, which essentially consists of one or more capacitors. Flory's ESB 48 is connected in parallel with both an input voltage source 40 and a ballast 42 for a lamp 46 (collectively a "lighting system 38"). The ESB 48 enables the lighting system 38 to "ride through" momentary interruptions in the input voltage source 40. In Flory's circuits (Figs. 2-10; Fig. 2 is reproduced below), when the input voltage 40 is first applied, the ESB 48 draws a large current from the input. The high current drawn by the capacitor(s) causes a voltage drop, which may be large enough to prevent the lighting system 38 from operating until the capacitors in the ESB 48 become sufficiently charged.

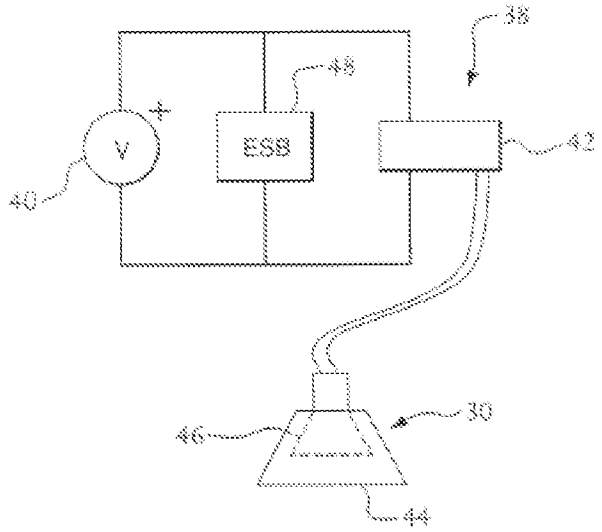


FIG. 2

To overcome this problem, the present Application discloses and claims an energy storage circuit that is designed to limit the amount of current drawn by the capacitor, while the capacitor charges. This current limitation prevents the input voltage from dropping too much, *i.e.* the input voltage remains high enough to operate the fan rotor, even while the capacitor charges.

Although the energy storage circuit limits the amount of current that may flow from the input into the capacitor, the energy storage circuit does not limit the amount of current that may flow from the input to the fan rotor circuitry. As can be seen in Fig. 1 from the Application (reproduced below), a cooling element 14 is coupled directly to a power source. A storage

element 16 is also coupled to the power source, but without restricting the amount of current that may flow from the power source directly to the cooling element 14. If the power source fails, the storage element 16 provides power to the cooling element 14.

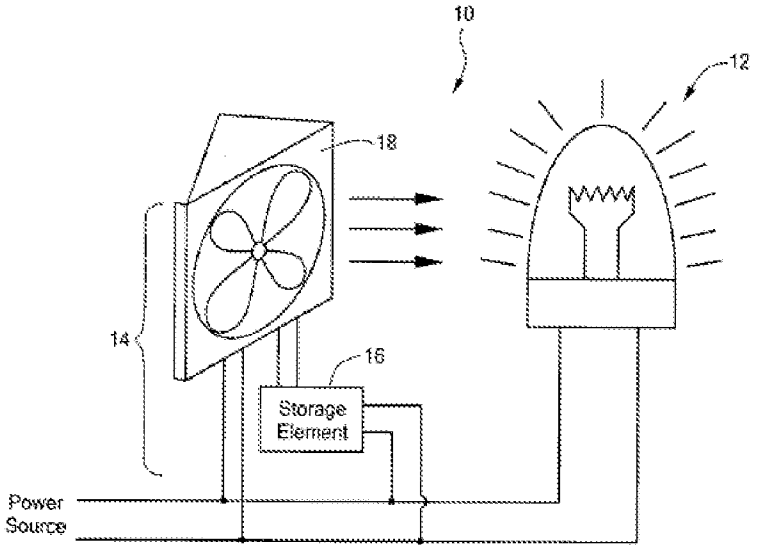
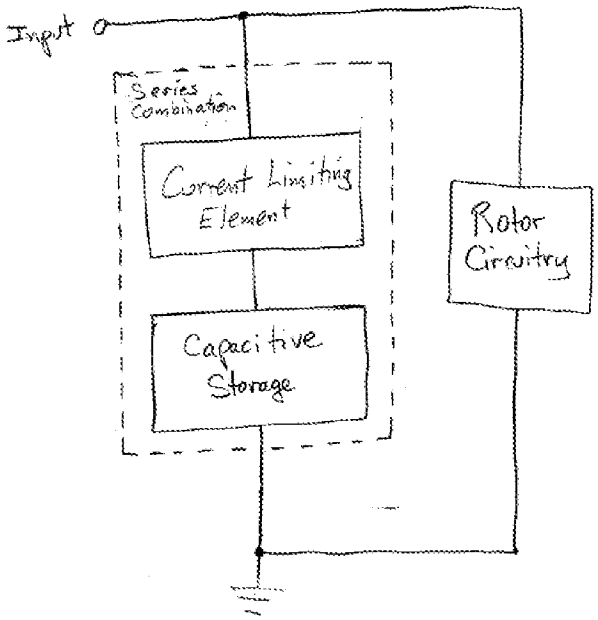


FIG. 1

In particular, the storage element 16 includes a current limiting element coupled in series with capacitive storage, and the series combination of the current limiting element and the capacitive storage are coupled in parallel with the rotor circuitry, and shown schematically below.



Significantly, the current limiting element is not in the current path between the power source (input) and the rotor circuitry.

In contrast, Flory (Fig. 7, reproduced below) teaches inserting a rectifier 62, which the Office Action interprets as a "current limiting element[1]," in series between the input and the load. Thus, the rectifier 62 limits current flow to the output (*i.e.*, to the lighting system) to the same extent the rectifier limits current flow into the ESB 48. Consequently, as Flory's ESB 48 charges, the rectifier 62 limits the amount of current that may flow to the output. The presently claimed invention does not suffer from this shortcoming.

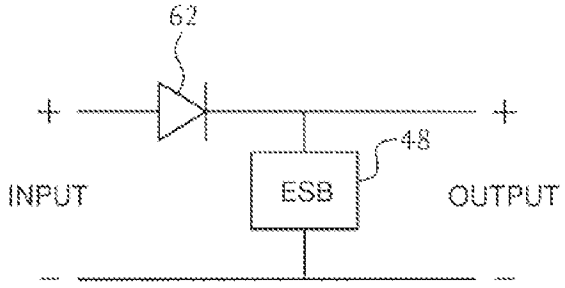


FIG. 7

The Office Action asserted that "the current limiting element 62 is configured to ensure that the circuitry has sufficient current to operate when the storage element is storing power," *i.e.* while the storage element is charging. (Office Action, page 3, lines 9-11.) The Applicant respectfully disagrees. If the rectifier 62 limits the amount of current that may flow from the input to the ESB 48, the rectifier also necessarily limits the amount of current that may flow to the output, because all the current (to the ESB 48 and to the output) must flow through the

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[1] The Applicant does not agree that the rectifier 62 is a "current limiting element," as recited in the claims. Flory's blocking rectifier 62 (Figs. 7-10) is connected between the supply 64 and the ESB 48 or 68 to prevent "bleedback," *i.e.* to prevent any current from flowing out of the ESB 48 back through the input to a non-lighting load. (Flory, column 3, lines 12-18 and column 5, lines 27-49.) The blocking rectifier 62 does not substantially limit current flow into the ESB 48 or 68, as would be required by the claims. However, solely for the purposes of this argument, the interpretation proposed by the Office Action is accepted.

rectifier 62. Nowhere does Flory disclose a current limiting element that is configured to ensure that the circuitry in the output has sufficient current to operate when the storage element is storing power (*i.e.* while the storage element is charging).

The Office Action also asserted that Flory discloses a "current limiting element (62) [that] is not coupled between the input and the control circuitry (Figure 2)." (Office Action, page 3, lines 14-15; emphasis added.) The Applicant respectfully submits that this assertion is not supported by the Flory disclosure. Fig. 2 (reproduced above) includes no "current limiting element (62)." The only drawings that include rectifiers 62 are Figs. 7-10. (Fig. 7, which is representative of Figs. 7-10, is reproduced above.) However, each of these rectifiers 62 is coupled between the input and the output. Flory's written description is consistent with Figs. 7-10. (Flory, column 5, lines 37-43.) Each of Flory's rectifiers 62 is coupled between the input and the output, and each of these rectifiers 62 limits the amount of current that may flow to the output. Thus, if anything, Flory teaches away from a "current limiting element [that] is not coupled between the input and the rotor control circuitry."

The Office Action also asserted that Flory discloses a "current limiting element (62) [that] isolates the control circuitry (control circuitry connected to power bus 20) from the storage elements." Flory's only "control circuits" connected to the power bus 20 are described at column 1, lines 35-37. These control circuits are external to the circuits shown in Figs. 2-10. The rectifier 62 does not, however, "control an amount of current drawn by the storage element at least in part as a function of the current required to be drawn by" such control circuits. Nowhere does Flory disclose a relationship between an amount of current drawn by the storage element 48 (while the storage element charges) and current requirements of these control circuits. The amount of current drawn by the storage element 48 (while the storage element charges) is independent of the current requirements of these control circuits.

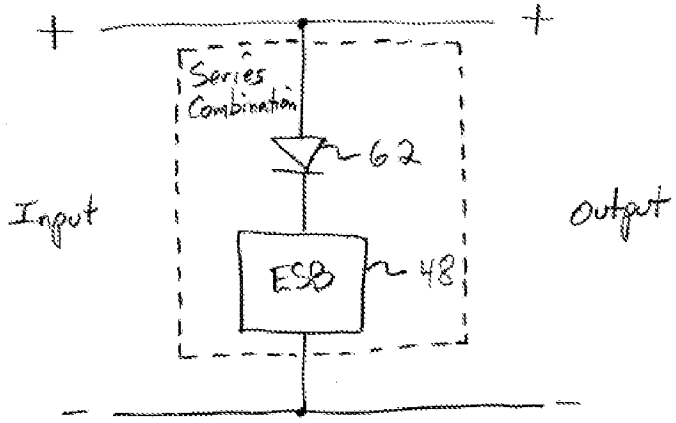
The Office Action asserted that Flory's "Summary of the Invention" provides a motivation to arrange circuits in either series or parallel and, therefore, suggests the claim limitation "the series combination of the current limiting element and the capacitive storage being coupled in parallel with the rotor circuitry." (Office Action, page 4, lines 14-17.) The Applicant respectfully submits that reliance upon Flory in this respect is not justified. Flory's Summary refers to series and parallel arrangements of capacitors. (Fleury, column 2, lines 39-41.) Flory suggests connecting capacitors or ESBs in parallel to store more energy. (Fleury,

column 4, lines 58-60.) On the other hand, the capacitors may be arranged in series, as shown in Flory's Fig. 4, so a circuit may use individual capacitors with lower voltage ratings.

Merely because Flory's capacitors may be arranged in parallel or series does not suggest that any arbitrary circuit components can be arranged in parallel or series. For example, a tuned circuit that includes a coil (L) in parallel with a capacitor (C), *i.e.*, an LC "tank" circuit, has high impedance at its characteristic resonant frequency. However, a series arrangement of the same coil and capacitor has very low impedance at its resonant frequency, even though both resonant frequencies are the same ($f_{resonant} = \frac{1}{2\pi\sqrt{LC}}$). Clearly, a parallel LC circuit cannot be arbitrarily replaced by a series LC circuit.

Thus, Flory's series and parallel capacitor arrangements do not suggest a "series combination of the circuit limiting element and the capacitive storage being coupled in parallel with the rotor circuitry," as recited in Claim 1. If Flory's rectifier 62 is in series with the ESB 48 (Fig. 7, reproduced above), this series combination is definitely not in parallel with the output. Only the ESB 48 is in parallel with the output. No art of record or knowledge generally available to those of ordinary skill in the art provides a motivation to modify Flory's circuit, such that a series combination of the rectifier 62 and the ESB 48 is coupled in parallel to the output.

Furthermore, if Flory's rectifier 62 were arranged in series with the ESB 48, and the resulting series combination were coupled in parallel with a lamp or other load (as shown below), the resulting circuit would be inoperative. The rectifier 62 would enable the ESB 48 to charge, but the rectifier 62 would prevent the ESB 48 from providing any power to the output. Thus, there is no reasonable chance of success in the modification suggested by the Office Action.



Lastly, the prior art of record does not teach all the limitations of the claims. For example, no art of record teaches a "series combination of the current limiting element and the capacitive storage being coupled in parallel with the rotor circuitry." (Emphasis added.)

Thus, the Applicant respectfully asserts that the Office Action has not made a *prima facia* showing of obviousness, because the Office Action has not shown any of the following, as required by MPEP §2143: (a) that there is a suggestion or motivation to modify or combine the references to yield the claimed invention; (b) that there is a reasonable chance of success in such a modification or combination; nor (c) that the prior art teaches all of the claim limitations.

In conclusion, no art of record or knowledge generally available to one of ordinary skill in the art, either alone or in combination, discloses or suggests a backup power supply for supplying electric power to fan rotor circuitry that controls rotation of a fan rotor, where the backup power supply includes a "charge-current limited energy storage circuit coupled to the input and comprising a current limiting element coupled in series with capacitive storage, the current limiting element at least in part controlling an amount of current flow from the input to the capacitive storage, the series combination of the current limiting element and the capacitive storage being coupled in parallel with the rotor circuitry," as recited in claim 1. For at least this reason, claim 1 is believed to be allowable.

Claims 7 and 13 contain similar recitations. Claims 7 and 13 are, therefore, believed to be allowable, for at least the reasons discussed above, with respect to claim 1.

All of the dependent claims depend directly or indirectly from claim 1, 7 or 13. These dependent claims are, therefore, believed to be allowable, for at least the reasons discussed above, with respect to claim 1.

For all the foregoing reasons, it is respectfully submitted that the present Application is in a condition for allowance, and such action is earnestly solicited. Applicant hereby requests that any extension-of-time or other fee required for timely consideration of this Application be charged to Deposit Account No. 19-4972. The Examiner is encouraged to telephone the undersigned attorney to discuss any matter that would expedite allowance of the present Application.

Respectfully submitted,

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